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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/675,360	09/30/2003	Ji-Cheng Zhao	134083-1	5974

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GENERAL ELECTRIC COMPANY  
GLOBAL RESEARCH  
PATENT DOCKET RM. BLDG. K1-4A59  
NISKAYUNA, NY 12309

EXAMINER

WARTALOWICZ, PAUL A

ART UNIT	PAPER NUMBER
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1754

DATE MAILED: 03/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)	
	10/675,360	ZHAO ET AL.	
	Examiner	Art Unit	
	Paul A. Wartalowicz	1754	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 30 September 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 12-15 and 17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 12-15 and 17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>02/17/06, 12/31/03</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claim 17 is rejected under 35 U.S.C. 102(e) as being anticipated by Zaluska et al. (U.S. 6514478).

Zaluska et al. teach a method for recovering hydrogen wherein a composition comprising lithium, boron, and magnesium, and hydrogen (claim 14) wherein hydrogen is liberated between the temperatures of 300 and 350°C (col. 5, lines 47-50).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 12, 13, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zaluska et al. (U.S. 6514478) in view of Strizki et al. (U.S. 6939529).

Zaluska et al. teach a method for recovering hydrogen wherein a composition comprising lithium, boron, and magnesium, and hydrogen (claim 14) wherein hydrogen is liberated between the temperatures of 300 and 350°C (col. 5, lines 47-50). Zaluska et al. fail to teach a compound formula for the composition.

Strizki et al., however, teach a method for generating hydrogen (col. 1, lines 1-2) wherein a metal borohydride wherein the metal is lithium, sodium, or potassium (the formula of a borohydride inherently teaches contacting a boron complex with hydrogen, col. 3, lines 1-7) for the purpose of using a well known compound formula for the production of hydrogen (col. 1, lines 10-15).

Therefore, it would have been obvious to one of ordinary skill in the art to provide metal borohydride wherein the metal is lithium, sodium, or potassium (the formula of a borohydride inherently teaches contacting a boron complex with hydrogen, col. 3, lines

1-7) in Zaluska et al. in order to use a well known compound formula for the production of hydrogen (col. 1, lines 10-15) as taught by Stizki et al.

As to the limitation in claim 12, wherein heating the hydrogenated compound to recover the hydrogen, Zaluska et al. teach wherein hydrogen is liberated between the temperatures of 300 and 350°C (col. 5, lines 47-50).

As to claim 13, Zaluska et al. teach a process as described in claim 12. Zaluska et al. also teach wherein hydrogen liberation is achieved in the temperature range of 100 to 300°C (col. 5, lines 7-10). Zaluska et al. fail to teach wherein the heating means comprises convectional heating.

It would be obvious to one of ordinary skill in the art at the time applicant's invention was made that any heating means to obtain the temperature requires some degree of convectional heating.

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zaluska et al. (U.S. 6514478) in view of Strizki et al. (U.S. 6939529) and Jensen et al. (U.S. 2004/0009121).

Zaluska et al. teach a method for recovering hydrogen as described above in claim 12. Zaluska et al. also teach wherein the hydrogen liberation occurs in the temperature range of 100 to 350°C (col. 5, lines 7-10). Zaluska et al. fail to teach heating conducted using microwave radiation, convectional heating, and electrical resistive heating.

Jensen et al., however, teach a method for hydrogen storage (paragraph 0003) wherein release of hydrogen from a composition requires heating wherein the heating is conducted using electrical heating elements (paragraph 0076, lines 10-12) for a temperature of 100°C (paragraph 0035, lines 15-16).

Therefore, it would have been obvious to one of ordinary skill in the art to provide electrical heating elements in Zaluska et al. in order to recover hydrogen from a composition (paragraph 0076, lines 10-12) in a chemically similar process as taught by Jensen et al. and for the reasoned explanation that both references teach overlapping temperature ranges (Zaluska et al., col. 5, lines 7-10; Jensen et al., paragraph 0035, lines 15-16).

Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zaluska et al. (U.S. 6514478) in view of Strizki et al. (U.S. 6939529) and Chen et al. (U.S. 2003/0129126).

Zaluska et al. teach a method for recovering hydrogen as described above in claim 12. Zaluska et al. fail to teach wherein further adding a dopant comprising titanium, vanadium, zirconium, yttrium, lanthanum, nickel, manganese, cobalt, boron, gallium, germanium, and the elements from the lanthanide series to the compound in an amount of less than or equal to about 20 wt % of the diffusion multiple.

Chen et al., however, teach a method for reversible storage of hydrogen (paragraph 0002) wherein dopants comprising zirconium, titanium, nickel, manganese, cobalt, boron, germanium, and the lanthanide series (paragraph 0018, lines 3-8) are

added in the proportion of hydrogen storage material to dopant of 1000:1 to 1:1 (paragraph 0016, lines 13-15) for the purpose of creating new compounds effective for the adsorption and desorption of hydrogen (paragraph 0017, lines 1-5).

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide wherein dopants comprising zirconium, titanium, nickel, manganese, cobalt, boron, germanium, and the lanthanide series (paragraph 0018, lines 3-8) are added in the proportion of hydrogen storage material to dopant of 1000:1 to 1:1 (paragraph 0016, lines 13-15) to hydrogen storage components in Zaluska et al. in order to create new compounds effective for the adsorption and desorption of hydrogen (paragraph 0017, lines 1-5) as taught by Chen et al.

Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zaluska et al. (U.S. 6514478) in view of Strizki et al. (U.S. 6939529) and Klett et al. (U.S. 2003/0175201).

Zaluska et al. teach a method for recovering hydrogen as described above in claim 12. Zaluska et al. fail to teach wherein the heating is effected by the heat from the exhaust of a fuel cell.

Klett et al., however, teach a process for pre-treatment of a fuel cell (paragraph 0003, lines 1-3) comprising a heating step wherein the heating is achieved using the exhaust products of the fuel cell (paragraph 0018, lines 20-22).

Therefore, it would have been obvious to one of ordinary skill in the art to provide using the exhaust products of a fuel cell (paragraph 0018, lines 20-22) in

Zaluska et al. in order to provide heat in a process using a fuel cell (paragraph 0018, lines 20-22) as taught by Klett et al.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Paul A. Wartalowicz whose telephone number is (571) 272-5957. The examiner can normally be reached on 8:30-6 M-Th and 8:30-5 on Alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on (571) 272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Paul Wartalowicz  
February 27, 2006



COLLEEN P. COOKE  
PRIMARY EXAMINER